Patent claims

1. A method for producing at least one signal (oscillation signal Pd), which indicates an oscillation in an electrical power supply system, in which method

- the phase current and the phase voltage are in each case sampled from at least one phase of the power supply system, forming phase current and phase voltage sample values (i, u),
- impedance values are formed from the phase current and phase voltage sample values,
- the impedance values are monitored for the presence of any oscillation and, if an oscillation is identified, at least one memory element (Sp) is set, and the oscillation signal (Pd) is output at its output,
- after setting the memory element (Sp), further impedance values are checked to determine whether the oscillation that has been found is still continuing,
- the memory element (Sp) remains uninfluenced if the oscillation continues, and the memory element is reset if the oscillation has stopped,

characterized in that

- the check of the further impedance values makes use of an oscillation model which is formed from previous impedance values associated with the oscillation, or from variables which are dependent on these impedance values,
- a check is carried out to determine whether a further impedance value formed at that time or a variable which is dependent on this further impedance value differs from the oscillation model, and
- any occurrence of a further impedance value or of a variable dependent on this impedance value which differs from the oscillation model is assessed as the oscillation having stopped.

2. The method as claimed in claim 1, characterized in that the oscillation model is determined by means of a least squares estimation method.

3. The method as claimed in claim 2, characterized in that

- a function in the form $f(x)=ax^3+bx^2+cx+d$ with the parameters a, b, c and d, for which one or more parameters can be defined to be zero from the start,

  or
- a sum of decaying sine and cosine functions

  is used

  as the model rule for the oscillation model.

4. The method as claimed in one of claims 1 to 3, characterized in that resistance values (R) are used as the variable dependent on the impedance values.

5. The method as claimed in one of claims 1 to 3, characterized in that reactance values (X) are used as the variable dependent on the impedance values.

6. The method as claimed in one of claims 1 to 3, characterized in that time derivative values (dZ/dt) of the impedance are used as the variable dependent on the impedance values.

7. The method as claimed in one of claims 1 to 3, characterized in that time derivative values (dR/dt) of a resistance are used as the variable dependent on the impedance values.

8. The method as claimed in one of claims 1 to 3, characterized in that time derivative values (dX/dt) of a reactance are used

as the variable dependent on the impedance values.

9. The method as claimed in one of claims 1 to 8, characterized in that
positive phase sequence system impedance values are formed from the phase current and phase voltage sample values (i, u), and a common memory element (Sp) is provided, and a common oscillation signal (Pd) is produced, for all the phases in the power supply system.

10. The method as claimed in one of claims 1 to 8, characterized in that
phase impedance values are formed from the phase current and phase voltage sample values (i, u) of each phase of the power supply system to be investigated for oscillation, and a dedicated memory element (Sp) is provided, and a dedicated oscillation signal (Pd) is produced, for each of these phases.

11. The method as claimed in claim 10, characterized in that
in order to form the phase impedance values,
- a variable U_re containing the real part of the phase voltage sample values, a variable U_im containing the imaginary part of the phase voltage sample values, a variable I_re containing the real part of the phase current sample values and a variable I_im containing the imaginary part of the phase current sample values are formed from the phase current and phase voltage sample values (i, u) for each phase,

- a phase real power variable P is determined from $P = U\_re \cdot I\_re - U\_im \cdot I\_im$
- a phase Wattless component variable Q is determined from $Q = U\_im \cdot I\_re + U\_im \cdot I\_re$
- a squared phase current amplitude variable I^2 is determined from $I^2 = I\_re \cdot I\_re + I\_im \cdot I\_im$
- system-frequency components are in each case removed by means of a least squares estimation method from the phase real power variable P, from the phase wattless component variable Q and from the squared phase current amplitude variable I^2, and
- phase resistance values R are determined from $R=P/I^2$ and phase reactance values X are determined from $X=Q/I^2$, and phase impedance values $Z=R+jX$ are thus determined.